Amendments to the Specification

Please replace the paragraph beginning at line 11 of page 7 with the following amended paragraph:

Each of the channel adapters [[15]] 24(n) and each of the device controllers 21(m) includes a cache manager [[16]] 25(n) and 23(m), respectively, to access to the cache memory 31, cache index directory 32 and common memory section 33. The particular operations performed during an access operation will depend on a number of factors, including the access operation to be performed, whether or not the data from the particular track to be accessed is cached in the cache memory 31, and whether or not the data contained in a cache slot has been modified or updated by a channel adapters cache manager [[16]] 25(n) during a storage operation. As described in the aforementioned Shagam application, the channel adapters [[15]] 24(n) typically perform storage and retrieval operations in connection with data in the cache memory 31, and the device controllers 21(m) perform "staging" and "de-staging" operations to transfer data in the storage devices 22 to the cache memory 31 for buffering (the staging operations) and to transfer data from the cache memory 31 to the storage devices 22 for storage (the de-staging operations). In performing the staging and de-staging operations, the device controllers 21(m) generally transfer data to and from the cache memory 31 in units of a track, that is, they will, during a staging operation, transfer all of the data in a track from a storage device 22 to a cache slot in the cache memory 31, and, during a de-staging operation, copy all of the data in a slot in the cache memory 31 to the track of the storage device 22 from which it was originally staged.

Please replace the paragraph beginning at line 1 of page 8 with the following amended paragraph:

The common memory section 33 maintains a number of work lists which are used to control operations by the channel adapters [[15]] 24(n) and storage controllers 21(m) during an access operation. In particular, the common memory section 33 includes a

cache slot replacement list, a pending write list and various lists which the channel adapters [[15]] 24(n) and storage controllers 21(m) use to communicate to coordinate staging operations (not shown). It will be appreciated that the various lists maintained by the common memory section 33 may comprise any of a number of convenient forms, including queues, trees, stacks or the like. The cache slot replacement list is used to control re-use of cache slots during staging operations in accordance with a convenient cache-slot re-use methodology. During a staging operation, the storage controllers cache manager 23(m) uses the cache slot replacement list to select a cache slot into which it will load the data retrieved from a storage device. (The aforementioned Shagam application describes a modified least-recently-used cache-slot re-use methodology used in one embodiment of the invention). The pending write list is used to identify cache slots which contain updated data, which has not been written to a storage device. During de-staging operations, the storage ~~controllers~~ controllers' cache managers 23(m) will use the write pending list to identify cache slots to be written to a storage device 22. Preferably, the cache slots which are identified in the pending write list will not also be listed in the cache slot replacement list, so that cache slots which contain updated data will not be used until the data has not been written to a storage device through a de-staging operation.

Please replace the paragraph beginning at line 19 of page 8 with the following amended paragraph:

The staging operation coordination communication lists include a plurality of stage request lists and a plurality of stage completion lists, with one stage request list being associated with each data store 20(m) and one stage completion list being associated with each host computer 11(n). The channel adapters' cache managers 25(n) ~~16(m)~~ use the stage request lists to store stage requests to be performed by the respective data stores 20(m), and the data stores' cache managers 23(n) use the stage completion lists to store stage completion messages to indicate to the respective channel adapters' cache managers 25(n) ~~16(m)~~ that the stage requests have been completed.

Please replace the paragraph beginning at line 25 of page 9 with the following amended paragraph:

More specifically, as described in the aforementioned Shagam application, during a retrieval operation, the cache manager [[16]] 25(n) of the initiating channel adapter 24(n) will initially access the cache index table 32(d) in the cache index directory 32 associated with the storage device 22 in which the data to be retrieved is stored, in particular accessing the track descriptor of the cylinder descriptor to determine, from the condition of the cached flag, whether the data from the track is cached in a cache slot in the cache memory. If the cached flag indicates that data from the track is cached in a cache slot the cache manager [[16]] 25(n) uses the cache slot pointer to identify the particular cache slot in which the data is cached and retrieves the required data from the cache slot.

Please replace the paragraph beginning at line 18 of page 10 with the following amended paragraph:

After the storage controller 21(m) has completed the staging operation, it will load a staging completed message in the stage completion list in the common memory section 33 associated with the host computer 11(n) which issued the staging request, and notify the host computer cache manager [[16]] 25(n) that a stage completed message has been loaded therein. At some point after receiving the notification, the host computers' cache manager [[16]] 25(n) can repeat the operations performed in connection with the retrieval request as described above, in particular accessing the cache index table in the cache index directory 32 associated with the storage device 22 in which the data to be retrieved is stored, in particular accessing the track descriptor of the cylinder descriptor to determine, from the condition of the cached flag, whether the data from the track is cached in a cache slot in the cache memory and, if so, use the cache slot pointer to identify the particular cache slot in which the data is cached and retrieve the required data from the cache slot. Since at this point the cached flag should indicate that the data from

the track is cached in a cache slot, the channel adapter's cache manager [[16]] 25(n) should be able to complete the retrieval operation.

Please replace the paragraph beginning at line 4 of page 11 with the following amended paragraph:

Similar operations occur during a storage operation, in which data in a particular track is updated with the additional operation of removing the identification of the cache slot containing data to be updated from the replacement list and loading it into the pending write list. During a storage operation, the cache manager [[16]] 25(n) of the initiating channel adapter 24(n) will initially access the cache index table in the cache index directory 32 associated with the storage device 22 in which the data to be updated is stored, in particular accessing the track descriptor of the cylinder descriptor to determine, from the condition of the cached flag, whether the data from the track is cached in a cache slot in the cache memory. If the cached flag indicates that data from the track is cached in a cache slot, the cache manager [[16]] 25(n) uses the cache slot pointer to identify the particular cache slot in which the data is cached and loads the update data into the cache slot. In addition, the channel adapter's cache manager [[16]] 25(n) will remove the identification of the selected cache slot from the replacement list to the pending write list so that the cache slot will not be re used until a de-staging operation has been performed in connection with the cache slot.

Please replace the paragraph beginning at line 17 of page 11 with the following amended paragraph:

On the other hand, if the cache manager [[16]] 25(n) determines from the cached flag that the data from the track is not cached in a cache slot, it will generate a stage request to enable the storage controller 21 (m) for the storage device 22 which maintains the data to be retrieved, load the stage request in the stage request queue for the data store

21(m) and notify the storage controller 21 (m) that a stage request had been loaded in the stage request queue. At some point after receiving the notification, the storage controller 21 (m) will retrieve the stage request and perform a staging operation in response thereto. In performing the staging operation, the storage controller 21 (m) will retrieve the data from the requested track, select a cache slot, load the data into cache slot and update the track descriptor in the cache index table associated with the storage device 22 to indicate that the data from the track is in the cache slot, in particular setting the cached flag and loading a pointer to the cache slot in the cache slot pointer.

Please replace the paragraph beginning at line 1 of page 12 with the following amended paragraph:

After the storage controller 21(m) has completed the staging operation, it will load a staging completed message in the stage completion queue in the common memory section 33 associated with the host computer 11(n) which issued the staging request, and notify the cache manager [[16]] 25(n) that a stage completed message has been loaded therein. At some point after receiving the notification, the cache manager [[16]] 25(n) can repeat the operations performed in connection with the retrieval request as described above, in particular accessing the cache index table in the cache index directory 32 associated with the storage device 22 in which the data to be retrieved is stored, in particular accessing the track descriptor of the cylinder descriptor to determine, from the condition of the cached flag, whether the data from the track is cached in a cache slot in the cache memory and, if so, use the cache slot pointer to identify the particular cache slot in which the data is cached and retrieve the required data from the cache slog. Since at this point the cached flag should indicate that the data from the ~~tack~~ track is cached in a cache slot, the cache manager [[16]] 25(n) should be able to complete the storage operation as described above.

Please replace the paragraph beginning at line 14 of page 12 with the following amended paragraph:

As described above, the data stores' cache managers 23(m) also perform de-staging operations using the pending write list to identify cache slots which contain updated data to be written back to the original storage device 22 and track whose data was cached in the respective cache slots. When a cache slot is de-staged, since at that point the data in the cache slot corresponds to the data on the respective storage device 22, the data stores cache manager 23(m) which performs the de-staging operation will remove the cache slots identification from the pending write list and return it to the replacement list so that the cache slot can be removed. It will be appreciated, however, that a host computer's cache manager [[16]] 25(n) may perform a number of retrieval operations and/or storage operations in connection with data in the same cache slot after the data in the track cached in the slot has been staged and before it can be de-staged, and so data in a cache slot can be updated a number of times before it is de-staged. In addition, it will be appreciated that after a cache slot has been de-staged, it may also be updated during a storage operation before the cache slot is re-used during a staging operation. When that occurs however, since, as described above, the host computer's cache manager [[16]] 25(n) removes the cache slot's identification from the replacement list and placed it on the write pending list as part of the storage operation, the cache slot will be subject to another de-staging operation before it can be re-used. Thus, a particular cache slot may be subject to de-staging a number of times with data cached for the same storage device 22, cylinder and track, without being reused.